

7/60

# DEPARTMENT OF GENETICS

School of Medicine  
Stanford University  
Palo Alto, California

## TO THE UNIVERSITY COMMITTEE ON GRADUATE DIVISION:

The Department of Genetics requests that it be given formal authority to recommend candidates for the Degree of Doctor of Philosophy. At the present time, the Department is not contemplating any special program for the Degree of Master of Science although it may, of course, participate in any such program as may be established for the School of Medicine in its five-year program as it applies to students with advanced standing.

### Program of the Department

The principal efforts of the Genetics Department will probably be concentrated on the training of medical undergraduates and in research training in experimental genetics of candidates who already hold an M.D. or a Ph.D. in another field of science. This emphasis does not stem from an undue specialization of thought on the part of the Genetics faculty but rather from the complexities of experimentation, requiring extensive training, that are adjuncts to fundamental work in this field. However, on the basis of my own years of experience at the Department of Genetics at the University of Wisconsin, and from the experience of several other departments of genetics, there is ample justification and opportunity for graduate training in this field, particularly for students holding unusually high qualifications. The first and crucial element of policy in our graduate program will be the careful selection of students so that they can benefit from this kind of program. Since we already have many applications from well qualified postdoctoral candidates and can also attract many eager students during their medical training, we have no reason to depart from the strict acceptance policy that is a necessary counterpart of the curriculum we are planning. On the other hand, since we can anticipate connections between genetics and a wide range of other scientific fields - from astronomy and space science to pediatrics - we feel that it would be unwise to hinder well qualified graduate students with too rigid a formal program. We are therefore placing more stress on our considered aims for graduate training and hope that the departmental faculty, with the advice and cooperation of our colleagues, can be entrusted with the execution of a program that will meet these aims.

### Aims of Graduate Study in Genetics

The achievement of the Degree of Doctor of Philosophy in Genetics from this Institution should signify

- 1) that the candidate has the inherent intellectual powers, industry, trustworthiness, and zeal for scholarship to continue to contribute to the fund of human knowledge and to perpetuate the traditions of careful scholarship in his own teaching.
- 2) that he has demonstrably realized these capabilities by the execution of a significant piece of scientific research in genetics embodied in a dissertation.
- 3) that his work should have demonstrated imagination and independence of thought and meticulous concern for experimental fact.

4) that he should have mastered a field of relevant knowledge of some breadth to furnish a critical background for his own research program and the substance of a useful teaching competence.

The most important aspect of graduate training towards these ends should consist of research in apprenticeship to a member of the faculty, himself active in research. In addition, it will be the responsibility of the student's advisor, acting in concert with the departmental faculty as a whole, to prescribe a program of study in the biological and physical sciences that will help ensure the fulfillment of these aims. Because of the varied backgrounds and orientations of different students, we feel that it is important to work out each program on an individual basis subject to the general university requirements for graduate study. If the current recommendations for language requirements are sustained, we plan to require that candidates be able to make effective use, in practice, of scientific material in their own field of work in at least two foreign languages, ordinarily French and German. The extent of implementation of this requirement will depend on the importance on the respective foreign literature for the student's specific field of study.

Candidates in the department will be expected to have at least a general knowledge of mathematics, chemistry (including biochemistry), physics and biology and specialized training in at least one of these areas of study. Before completing his first year of graduate study, the student should have had at least 1) differential and integral calculus and one course in statistics 2) general, analytical, organic and physical chemistry 3) a year of general physics 4) a year of general biology. In addition, most students will be expected to have had the equivalent of the first year medical course in biochemistry as now given here and one or two courses in genetics as given either in the Department of Biology or of Genetics. After this year's work, the student's preparation in course work will be reviewed by the faculty and, in consultation with the student, a specific program for completion of his formal studies worked out. After two years of graduate study, and the substantial completion of formal coursework, each student will be required to submit to a qualifying examination in such form as the faculty shall prescribe. The purpose of this examination shall be to test the student's proficiency in the general background of knowledge in genetics. At this time, however, the student should already have begun work on his dissertation and in the year following his successful passing of the qualifying examination, may submit his dissertation for the final examination by the reviewing committee. This examination will constitute, in effect, a defense of the thesis. In both the preliminary and final examinations, we are looking forward to the assistance of several well qualified professors in other departments. In practice, the continuation of the candidate's work is contingent on the availability of facilities for research under the supervision of his professor and his performance is consequently under constant scrutiny. Likewise, almost all of our students will find it necessary to avail themselves of fellowship or traineeship support whose administration is entrusted to the Department and which again implies a continued exercise of informed confidence in the candidate's capabilities.

A typical course program for a candidate in genetics who entered with reasonably satisfactory qualifications in general subjects would include the following items: Biology 142-143, Experimental Embryology and Analysis of Development; Biology 148, Genetics of Microorganisms; Biology 151, Evolutionary Genetics; Biology 152, Gene Action; Biology 153-154, General Microbiology and one or two additional graduate courses in biology; Biochemistry 101-102 and 102A, General Biochemistry with laboratory; Genetics 201-202, Medical Genetics; Genetics 302, Transplantation Seminar; other electives in genetics and biochemistry as available.

The academic qualifications of the present staff of the Department are listed on the attached pages. This staff consists of Professor Joshua Lederberg, Executive; Assistant Professor Leonard A. Herzenberg, Assistant Professor Gustav J. V. Nossal. In addition, experienced research associates, including Dr. Esther M. Lederberg, play an important role in the indoctrination of research students into the laboratory programs and research techniques.

We contemplate adding another professor to our faculty, in human genetics. In addition, the Department of Genetics functions in close liaison with other departments and Professors C. Yanofsky and D. Perkins in Biological Sciences, N. Kretzmer and H. Schwartz in Pediatrics, and A. Kornberg, M. Cohn, and A. D. Kaiser in Biochemistry among others, will play an important role in the training and evaluation of our students. My own appointment as Professor of Biology also helps materially in maintaining this liaison.

The paper, "A View of Genetics," Stanford Medical Bulletin (Volume 17, No. 3, August 1959) is submitted herewith as a perspective on the immediate outlook of experimental genetics, and (through its bibliography) as a supplement to the curriculum vitae of the author.

A handwritten signature in cursive script, reading "Joshua Lederberg".

Joshua Lederberg  
Professor of Genetics  
Executive Head, Department of Genetics

September 28, 1960